

Amendments to the Drawings:

Please substitute the enclosed FIG. 1 for the FIG. 1 currently on file. No new matter has been added.

REMARKS/ARGUMENTS

Reconsideration of this patent application is respectfully requested in view of the foregoing amendments, and the following remarks. Claims 10-18 are in the application. Claims 1-9 have been canceled. The drawings have been amended. No new matter has been added.

The Examiner objected to the drawings, and requested that FIG. 1 be labeled "prior art" if FIG. 1 is indeed prior art. Applicant submits herewith a new FIG. 1 in which the "prior art" designation has been removed, as only the step preceding step a) is prior art, and the remaining steps are the subject of the application.

The Examiner rejected the claims under 35 USC §112, paragraphs 1 and 2. Applicant has canceled claims 1-9 and has rewritten them as new claims 10-18. In particular, Applicant has clarified the invention in independent claim 10, which now states that the steps of coating the first ring and subsequent rings occur using the same predetermined coating parameters. Applicant has also clarified that the pre-stress placed on the first ring

is equivalent to the stress on the ring in an installed state of the ring, and that the pre-stress placed on the second ring is equal to the measured inherent stress of the coating. Applicant has also amended the claims to add antecedent basis where necessary. Applicant submits that the technique of applying a pre-stress to the rings is sufficiently explained in the specification on pages 5-7 of the specification, and in the drawings at FIG. 2, where it shows the stress being applied to the ring, shown unstressed at 04, and stressed in two different directions, at 02 and 05. The specification teaches on page 7 that this can be accomplished using a simple bracing device.

The Examiner rejected claims 1-9 under 35 USC 103(a) as being unpatentable over Miyazaki et al. in view of Dworak et al. Applicant respectfully traverses.

Miyazaki (US 5,449,547) discloses a piston ring for internal combustion engines, having a base material of steel or cast iron (see col. 2, line 25) and a chrome nitride coating, that is applied to a sliding surface of the piston ring. The coating consists of crystalline CrN with oxygen in a solid solution state.

Miyazaki is silent with regard to the problem of inherent stress of said coatings, which results in the tendency of the coating to peel off, as described on page 2 of the present application. Miyazaki only discloses the dependency of the occurrence of cracks from the slide speed applied to the piston ring, i.e. from an externally applied load (see table 3).

Dworak et al. (US 4,535,683) does not mention the problem of inherent stress of the coating either. Moreover, Dworak does not disclose a piston ring at all. In col. 2, lines 26-44 and col. 1 lines 51 to 60, Dworak refers to the problem of attaching a piston shaft 5 to a piston head (i.e. the partially stabilized zirconium oxide member 3). The piston shaft and the piston head are held together by an annular member 13 (see Fig. 1 and col. 3, lines 36-42. This annular member is secured by a steel shrink ring 15, which is shrunk around the annular member 13 (see col. 3, lines 42-48). This means that the lower end of the piston head is subjected to a compression strain by the shrink ring 15, the compression strain counteracting thermally induced tangential stresses, i.e. stresses resulting from the thermal expansion of the piston head during operation of the piston. The shrink ring 15 does not equal a coating, as suggested by the Examiner.

Actually, no coating is disclosed at all.

Therefore, combining Miyazaki with Dworkin would not lead to the present invention, because neither reference teaches measuring the inherent stress of the coating, and using that measurement in the coating process, to eliminate the stress on the coating.

Accordingly, Applicant submits that claims 10-18 are patentable over the cited references, taken either singly or in combination. Early allowance of the amended claims is respectfully requested.

Respectfully submitted,
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ECR:cmm
Enclosure: One (1) sheet of Replacement drawings

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on July 6, 2007.

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